WHAT IS CLAIMED IS

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1. A magneto-resistive magnetic sensor, comprising:

a magneto-resistive structure changing a resistance thereof in response to an external magnetic field,

a cap layer,/provided on a top surface of said magneto-resistive structure;

a pair of magnetic regions disposed at both lateral sides of said magneto-resistive structure, said magnetic regions having a magnetization pointing in a common direction;

a pair of electrodes provided on said pair of magnetic regions so as to oppose with each other across said magneto-resistive structure, said electrodes having respective overhang parts extending over said magneto-resistive structure so as to oppose with each other with a gap therebetween,

wherein each of said overhang parts covers said/cap layer on said magneto-resistive structure in such a state that an oxidation-resistant conductive lawer is interposed between said cap layer and said oferhang part.

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2. A magneto-resistive magnetic sensor as claimed in claim 1, wherein said oxidation-resistant conductive layer is formed of a metal selected from the group consisting/of Au, Pt and Cu.

3. A magneto-resistive magnetic sensor as claimed in claim 1, wherein said oxidation-resistant conductive layer has a thickness larger than about 1nm.

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4. A magneto-resistive magnetic sensor as

10 claimed in claim 1, wherein said oxidation-resistant
conductive layer has a thickness of larger than about
3nm.

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5. A magneto-resistive magnetic sensor as claimed in claim 1, wherein said oxidation-resistant conductive layer has a thickness of smaller than about 10nm.

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6. A magneto-resistive magnetic sensor as claimed in claim 1, wherein said cap layer comprises Ta.

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7. A magneto-resistive magnetic sensor as claimed in claim 1, wherein said magneto-resistive structure comprises an anti-ferromagnetic pinning layer, a ferromagnetic pinned layer having an exchange coupling with said anti-ferromagnetic pinning layer, a ferromagnetic free layer, and a non-magnetic

separation layer interposed between said ferromagnetic pinned layer and said ferromagnetic free layer.

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8. A method of fabricating a magnetoresistive magnetic sensor, comprising the steps of:
forming a magneto-resistive structure on a
substrate, said magneto-resistive structure changing a
resistance thereof in response to an external magnetic
field;

depositing a cap layer on a top surface of said magneto-resistive structure;

depositing an oxidation-resistant conductive layer on a top surface of said cap layer, said magneto-resistive structure, said cap layer and said oxidation-resistant conductive layer forming thereby a magneto-resistive layer;

patterning said magneto-resistive layer by applying a lithographic process, to form a magneto-resistive region on said substrate;

depositing a ferromagnetic layer of said substrate to form a pair of domain control regions at both lateral sides of said magneto-resistive region;

depositing an electrode layer on said substrate such that said electrode layer covers said magneto-resistive region and said domain control regions continuously;

patterning said electrode layer to form a pair of electrodes on said pair of domain control regions respectively, such that said electrodes extend to each other over said magneto-resistive region with a gap formed between said electrodes, said step of patterning being conducted by applying an etching process to said electrode layer until said oxidation-resistant conductive layer is exposed at said gap; and

patterning said oxidation resistant conductive layer until said cap layer is exposed at said gap.

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9. A method as claimed in claim 8, wherein said step of depositing said oxidation-resistant layer comprises the step of depositing an Au layer as said oxidation-resistant layer, and wherein said step of patterning said oxidation-resistant layer comprises a reactive-ion etching process.

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10. A method as claimed in claim 8, wherein said step of depositing said cap layer comprises the step of depositing a Ta layer as said cap layer, and wherein said step of patterning said cap layer comprises an ion milling process.

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11. A method as claimed in claim 8, wherein said step of patterning said oxidation-resistant layer and said step of patterning said cap layer are conducted by an ion milling process.

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12. A method as claimed in claim 8, wherein said step of patterning said oxidation-resistant layer and said step of patterning said cap layer are

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conducted by using a common resist mask.

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